A STUDY ON DEPRESSION, ANXIETY AND QUALITY OF LIFE OF CHRONIC RENAL FAILURE PATIENTS ON MAINTENANCE HEMODIALYSIS.

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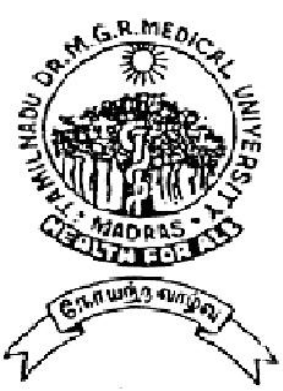

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled "**A STUDY ON DEPRESSION, ANXIETY AND QUALITY OF LIFE OF CHRONIC RENAL FAILURE PATIENTS ON MAINTENANCE HEMODIALYSIS"** is a bonafide record work done by **Dr. ARUL MARY LUBEETH. A** under my direct supervision and guidance, submitted to the Tamil Nadu Dr.M.G.R Medical University regulation for **M.D Branch XVIII – Psychiatry**.

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DECLARATION

I, **Dr. ARUL MARY LUBEETH.A** solemnly declare that the dissertation titled **"A STUDY ON DEPRESSION, ANXIETY AND QUALITY OF LIFE OF CHRONIC RENAL FAILURE PATIENTS ON MAINTENANCE HEMODIALYSIS"** has been prepared by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other University board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the award of M.D degree **Branch – XVIII (Psychiatry)** to be held in April 2013.

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INTRODUCTION

End stage renal disease is a condition marked by gradual decrease in the function of both the kidneys from where no improvement in renal function could be expectd and the patient will have to depend on the dilayzing machines for the removal of the waste products of the body on the regular basis. Treatment of this conditions involves dietary adjustments, regular medications and regular dialysis or renal transplantation. For several reasons, renal transplantation is not a easily available option. Patient may not be able to procure a stuitable kidney, age and other medical conditions may debar the patient from that treatment option leaving him with the only option of regular dialysis.

Dialysis as a procedure, either hemodialysis or peritoneal dialysis or other ambulatory dialysis methods involves several physical as well as psychological trauma that will lead to various psychiatric illness which in turn imapairs the quality of life of these patients. The patient will have to tolerate the loss of independence, dependence on the dialysis machines, rigorous drug regimens involving drugs like multiviatamins, phosphate binders, calcium supplements, iorn supplements, errthropoietin injections…etc, and not to forget the

financial burden. But even a good compliance to these treatment procedures are not found to produce to a meaningful productivity and quality of life. The “X” factor in most of these situations has been identified as psychological impairments. Hence now adequate programs has been put in place in several countries for the regular screening for these impairments among ESRD patients.

Depression has been identified as the most common psychiatric disorder prevalent among this group of patients, and its role in causing morbidity and mortality in these patients has been studied in detail. Old age, pain, comorbid medical or surgical conditions, financial stresses, poor social support, have been identified as few important factors that predispose the patients to depression and other other psychological impairments. Suicide is one feared outcome due to the presence of depression among the ESRD patients. Though anxiety is also another common condition but the impairment it causes on the final outcome in the patient is still under research. These along with other social and psychological factors has been found to affect the overall quality of life of these patients to a greater extent .

The western countries are paying greater attention for the identification and treatment of these psychcological impairments that occur as comorbidity among ESRD patients. But studies among indian

population are very minimal. Several studies of this kind will have to be conducted on the indian population, inorder to get a clear perspective about the exact quantum of the problem as well as to show the improvement it can have on the ESRD population if these problems are treated.

SCOPE OF THE STUDY:

Several studies on the prevalence of depression and anxiety has produced results in a very broad range, ranging around 20% to 70%. Indian studies in this perspective are less compared to the quantum of western studies. Hence a study on the prevalence of depression and anxiety among the indian population and the various factors that are found to have association with these psychological impairments will give a better idea about the occurrence of these conditions among indian ESRD patients. Again studying the quality of life of the ESRD patients will give an idea about the subjective perception of well being in these patients and a possibility to identify the areas where intervention could be planned in the future to improve their quality of life.

REVIEW OF LITERATURE

Patients with chronic renal failure on maintenance hemodialysis (HD) present with a myriad of potential mental health problems. Of these, depression and anxiety disorders have been very commonly acknowledged as the more prevalent entities among this population. Though they are recognized as commonly encountered co morbidities seen with ESRD patients on hemodialysis, they are rarely identified and are insufficiently treated. Studies by Brownbridge.G et al (1994, 1999), conducted on pediatric and adolescent hemodialysis patients reveal that psychological impairments may adversely affect the somatic indicators like level of potassium, blood pressure, and blood level of creatinine, and urea. Presence of depression have been studied to influence the quantum of interdialytic weight gain (Taskapan et al, 2005). Patients on dialysis often suffer the loss of work status, health, time and independence. A sense of uncertainty about the future and an acute fear of their own mortality develops, once medical complications occur. The individual response to the need of long term renal replacement therapy is varied, and is often related to the trait anxiety, locus of control, coping mechanisms of the patients etc.(S.Kohli et al, 2011). Depression in this population of patients

further complicates the picture and is associated with a significant morbidity and increased mortality.

Depression along with other psychological impairments have been a major determining factor about the quality of life in these set of patients. Impairment in quality of life may have a number of dire psychological effects in end stage renal disease patients as they may feel less motivated to engage in medical care or even to maintain simple self care. Few patients choose even not to continue with their hemodialysis.

Although the studies are inconsistent, activation of inflammatory response system have been proposed as one factor contributing to the onset of depressive symptoms in ESRD patients on hemodialysis. Uremia and its adverse effects on various neurotransmitter systems itself will predispose the patients to depression. Comorbid medical conditions and multiple drug intake may also be contributory. Last but not the least, various psychological factors also contribute in a variety of ways for the occurrence of depression in ESRD patients on hemodialysis.

PREVALENCE OF DEPRESSION IN ESRD PATIENTS:

Many studies have been conducted to study the prevalence of depression in ESRD patients on hemodialysis. The results obtained in

various studies have been quite variable with a wide range. But it could be agreed upon that the rate of depression is definitely high among HD patients. The lifetime prevalence of depressive disorder in general population is about 16.2%, according to a study by Kessler et al (2003). In a study by Araujo et al (2011), where 400 patients with ESRD were studied, depression was identified in 19.3% of the patients. Becks depression inventory was the tool used in the study. Prevalence of depression was found to be between 20% to 30% in several studies (Taskapan et al, 2005; Drayer et al, 2006; Cukor et al, 2008; Hedayati et al, 2008; Son et al, 2009;). Among the above mentioned studies, Son et al conducted the study on a study population of 146 patients while Taskapan et al conducted the study on 40 patients. In most of the studies above mentioned Becks depression Inventory (BDI) was the commonly used tool to identify the presence of depression. In one study by Cukor et al, Hospital anxiety and depression scale (HADS) was used. In the study by Taskapan et al, Hamilton depression rating scale (HDRS) was used for detecting depression in these patients.

The prevalence of depression was identified as between 30% to 40% in the study conducted by Kalender et al, 2007; Ibrahim & Salamony et al, 2008; Hsu et al, 2009; Chen et al,2010. In the first two studies, BDI was used and in the next two studies, HADS was used. In

a study conducted by Keskin & Engin et al, 2011, on 92 patients, where BDI was used as a tool depression was identified in 40.2% of the participants. In another study conducted by Montinaro et al, 2010, which was comparative study between patients on hemodialysis and patients with CKD stage 1 – 2, depression was identified in 15 out of the 30 participants in HD arm. In another study by Bossola et al (2010), conducted on 80 patients, depression was identified in 52.5% of the study population. One another important study where study was conducted on 861 patients by Kao et al (2009), a multicentre trial conducted in Taiwan, depression was identified in 60.5% of the study population. It was conducted to study the relationship between the economic, social, psychological factors and its relationship with the health related quality of life of hemodilaysis patients. In this study, BDI was used to screen for depression.

Among several studies mentioned earlier, the study done by Cukor et al gains greater significance as he followed up his initial study with a follow up study after 16 months. The outcome of the study points to the following facts. There were 70 participants in the study and in his initial study he diagnosed major depression in 20% and dysthymia in 9% of the of the study participants. In the follow up study, 42% of the baseline depressive patients still carried the

diagnosis and this percent of people were found to have a very poor quality of life. Two third of the 9% patients who carried both the diagnosis of anxiety and depression in the initial study still carried both the diagnosis, pointing the fact that they make a nasty combination which have a less chance for a natural remission.

In an Indian study conducted in Lucknow, by M.L.Patel, et al, and published in International journal of scientific and research publication (2012), among the 150 participants, 50 patients were identified with depression. HADS was used as the screening tool.

Considering the extreme range of outcome of the above mentioned studies, its quite clear the percentage prevalence of depression among patients on maintenance hemodialysis is not uniform with several studies. But for all practical purposes, the prevalence can be considered to be between 20 to 30% as several studies have fallen in this range.

BIOLOGICAL FACTORS UNDERLYING DEPRESSION IN ESRD PATIENTS:

The causative factors underlying depression in hemodialysis patients is multifactorial, with biological, social and psychological factors contributing towards it. Depressed patients have higher levels

of circulating IL- 1, IL – 6, Tumour necrosis factor - alpha and other acute phase reactants. ESRD patients have also been found to present the same picture with regard to cytokine levels (Kimmel PL, 1998). Several other studies have also investigated the relationship between depression and cytokine levels (Loftis et al, 2010; Sonikian et al, 2010). In the study by Sonikian et al, the level of cytokine IL – 6 was observed to be of greater significance in comparison with other cytokines, in causation of depression. People with raised level of IL – 6 scored highly in Zung Self- Rating Depression scale, and this observation was found to be statistically significant at $p<0.02$ level. In the review article by Jennifer.M.Loftis (2010), he studied the various neuroimmune mechanisms pointed out the importance of the Hypothalamic – pituitary axis hyperactivity in these depressed patients. During hemodialysis, activation of mononuclear and dendritic cells secondary to the blood – dialyzer interaction leading to the production of inflammatory cytokines could be the cause for the increased cytokines level seen among ESRD patients(Petrosa et al, 2000; Sudhanshu Agarwal et al, 2010).

The underlying biological mechanisms have also been thought in terms of a defect in serotonergic function and hypercortisolemia,

secondary to stimulation of hypothalamic-pituitary- adrenal axis, leading to depression and increasing mortality.

Low hematocrit have also been studied as a contributing factor. (Beusterien et al, 1996). Improving hematocrit level from very low levels have been associated with a state of well being. The benefits of improving the hematocrit level beyond 35% have been questioned as studies did not find a significant relationship.

Relationship between serum albumin level and depression in endstage renal disease was studied by Friend.R et al in 1997. He studied 32 hemodialysis and 40 peritoneal dialysis patients and found that depression detected at first time assessment of the patient predicted the decrease in albumin from the first time assessment to second time assessment separated by 6 months duration. But the reverse of the relationship that albumin levels influence depression from first time to second time assessment were not found. Another study that demonstrated this correlation were done by Huang & Lee (2007) where the outcome was that, the ESRD patients with major depression had significantly lower albumin and increased ferritin levels than the set of patients without major depression.

Patients with ESRD have a state of secondary hyperparathyroidism due to renal failure which plays a greater role in

the causation of the nervous system dysfunction. This elevated parathyroid hormone level causes deleterious effect on brain cells by elevating the cytosolic calcium levels. This phenomenon could also be a contributory factor behind the causation of dysfunctions in nervous system.

Malnutrition as one contributing factor have been studied by several researchers. A high incidence of depression, and a greater correlation between severity of depression and the quantum of malnutrition in chronic hemodialysis patients have been studied by Koo.J.R. et al, (2003). He cross sectionally examined 62 ESRD patients who have been on hemodialysis for more than 6 months and having no acute illness within the past 3 months. Depression was measured using BDI and overall protein – energy nutritional status was assessed using Subjective Gobal Assessment (SGA). Nutritional parameters were found to have high correlation with the severity of depression.The relationship between malnutrition and emotional symptoms among maintanence hemodialysis patients was also demonstrated in many other studies (Bossola et al, 2009; Salwa Ibrahim & Omima El Salamony, 2008). But, it is not well established whether depression is the cause or the end result due to increase of proinflammatory cytokines frequently found in ESRD patients on

hemodialysis that cause more protein catabolism, decreased oral intake and malnutrition in these patients.

Genetic factors in the form of single neucleotide polymorphisms occurring in the promoter region of the pro inflammatory cytokines demonstrate a strong association with biological and nutritional markers along with indices of comorbidities (Balakrishnan et al, 2004). Genetic factors with regard to racial differences are also widely studied as increased prevalence of depression is noted among Caucasian population than African – American population (Riolo et al, 2005). But there are several studies that also, contradict these claims.

Few studies evaluated the role of dialysis materials in causation of depression in ESRD patients. Decreased incidence of anxiety and depression in the subset of patients on peritoneal dialysis, while compared with patients on hemodialysis provides a clue in this direction (Ginieri- Coccossis et al, 2008; Noshad et al, 2009). Another study by Hsu et al in 2009, demonstrated that the incidence of depression was greater in patients using cellulose derivative dialyzers then those using polysulfone dialysers ($p = 0.005$).

PSYCHOLOGICAL AND SOCIAL FACTORS IN DEPRESSION:

Several psychological factors have been studied, starting from perception of the illness to the environment in the dialysis unit. Because ESRD is a lifelong illness, the perception of overwhelming illness is inevitable. This illness perception varies with regard to age, gender, ethnic and cultural background, personality and extent of social support and marital satisfaction. Again the perception of the illness can differ at different stages of the hemodialysis patients course. It is important to understand patients expectations and attitude about their illness in order to ensure compliance with treatment (Kaveh et al, 2001). Perception of illness and depression have a greater impact on the differential survival of the patient (Kimmel PL et al, 2000). Intrusiveness of the thoughts about the perception of the illness is closely related to the prevalence of depression and the quality of life of these patients (Christensen & Ehlers, 2002). Chan et al, (2009) examined 151 long term dialysis patients, to study the relationship between perception of loss and prevalence of psychiatric morbidity. He used Kidney Disease Loss Scale (KDLS), developed specifically for this study. He concluded that patient- defined losses may contribute to the high level of depression which in turn may reduce the patients coping and quality of life. Greater illness perception is associated with higher mortality rate (Shulman et al, 1989). Patients perception of their

well being is one of an essential component of quality of life. Hence these findings in the above mentioned studies are very important as they stress on the fact that the perception about the illness is strongly correlated with psychological morbidities. As cognition is amenable to modification through counseling or psychotherapy, assessment of these aspects gains greater significance.

Social support is the perception of an individual that he is component within a complex network, in which he can give and receive affection, aid and obligation. This support can be from family, friends, work place, medical personal, etc. Seminal reviews by Cassell and Cobb in 1976 stressed the importance of social relationship for health. Good social support goes a long way in helping a patient adjust to chronic illness (Christensen AJ et al, 1994; House JS et al, 1988; McClellan WM et al, 1992). In fact, the differences in the quantum of social support has been postulated as one important factor behind variable mortality rates seen among dialysis patients among units and is also possibly responsible for differences in compliance (Bleyer AJ et al, 1999). In a study by Uchino BN et al, in 1996, he studied the impact of good social support on all the systems of the body and predicted a positive outcome in any chronic illnesses.

Marital status is one another issue, though it can be subsumed under support system, it is of greater significance in predicting the psychological well being of these patients. Unhappily married individuals report poor health conditions than a happily married or even divorced people with very similar demographic characteristics. In a study conducted on 17 medically stable patients maintained on hemodialysis conducted by Finkelstein FO et al, 1976, more than 50% of the couples that included a patient with ESRD had experienced marital disruption which in turn had an impact on the compliance and treatment outcome. The spouses level of distress and depressive affect were found to directly correlate with the patients BDI scores (Daneker B et al, 2001). Sexual dysfunction among ESRD patients on hemodialysis is another important factor within the family dynamics which may stress out an individual. In a study conducted by Fryckstedt J et al in 2007, 117 ESRD patients were evaluated for their sexual function using a questionnaire, which compared their sexual function before and after the onset of the renal disease. A decrease in sexual desire was seen in 46% of the participants and decreased initiative was seen in 68% of the patients. With regard to problem with erection and lubrication, 68% of the participants answered positively. Overall more than 50% of the participants admitted that the decrease in sexual

function grossly affected their psychological well being. Biological and endocrine changes associated with marital discord have been studied and few substantial evidences has been obtained to explain the behavioral and emotional disturbances (Kiecolt-Glaser JK et al, 1996),

Families may be a source of support or turn out to be a matter of stress. In a study by Steidl JH et al, 1980, twenty three medically stable patients on long term dialysis treatment and their families were studied to find the relationship between adherence to treatment and patterns of family interaction. Significant relationship were seen between the overall family functioning and overall medical condition and adherence to treatment. Similar relationship were also obtained from other studies done on this subject (Brownbridge G et al, 1994; Reiss D et al, 1986; Turner – Musa J et al, 1999).

Dialysis unit characteristics and the relationship with the dialysis personnel were also found to modify the disease perception, outcome and the sense of wellbeing (Alleyne S et al, 1996). Patients better satisfaction with the dialysis unit staff and their perception that they care for them were found to correlate with higher serum albumin levels but these observations are yet to be replicated by similar studies.

Socioeconomic status and the location of the dialysis unit might contribute to the outcome of the patients on maintanence hemodialysis.

There have been studies that demonstrate the increased incidence of ESRD among people from low socioeconomic status (Perneger TV et al, 1995; Young EW et al, 1994), but studies that study the correlation between the socioeconomic status and survival & psychological well being of the ESRD patients on maintenance hemodialysis are very small in number. In one study of such kind, poor socioeconomic status of the patients had a strong negative effect on the survival, but this observation was found to corroborate only in black patients and such correlation was not seen with white patients (Port FK, Wolfe RA et al, 1990).

There have been no studies to show positive correlation between the patient satisfaction with the physician and the outcome, but there are few datas to substantiate this point. The availability of health services and the accessibility to them, and the information about the illness, were found to influence the quality of life of the patients on maintenance hemodialysis.

SUICIDE IN ESRD PATIENTS:

Suicide is the most serious outcome among the various psychological disturbances seen among ESRD patients on maintenance hemodilaysis. Kurella et al, (2005) in his study followed up the patients

who were on hemodialysis between 1995 and 2001. He reported that the death rate from suicide was 24.2 per 100,000 dialysis patient-years while the standardized incidence ratio for suicide in was 1.84. In a study by Chen CK, Tsai YC et al, (2010), two hundred ESRD patients on hemodialysis with age above eighteen years were enrolled for the study. He concluded that 70 patients out of the 200 patients had depression and 43 patients had suicidal ideation in the previous month. Results revealed that the presence of depression and anxiety were robust indicator about the presence of suicidal ideation. Low body mass index and the number of comorbid physical illness were identified as predictors of depression.

In another study conducted by Martiny C, de Oliveira e Silva AC et al, (2011), suicide risk was found to be associated with several factors. Prevalence of psychiatric disorders was found to be risk factor. Nonreligious patients were found to have 8 times more chance to have suicide risk compared to religious patients. But in depressed patients this effect was found to be annulled.

It is an important observation, that a number of patients on maintenance hemodialysis had withdrawn from dialysis before their death. But nevertheless, only a minimal percentage (12%) of the study responders were aware of the fact that withdrawing from dialysis was

equivalent to suicide (Cohen et al, 2002). In the study by Keskin and Engin, (2011), old age of the patient, being a male, low education, substance dependence and hospitalization for psychiatric illness were identified as strong predictors of suicide risk among hemodialysis patients.

INSOMNIA:

Insomnia can well be an independent problem due to several factors or a presentation due to the presence of depression. Depression may be the etiology or an outcome of insomnia. The presence of overt depression is seen with 20% of the patients with >5 score (difficult sleep) in ptisburg sleep quality index among ESRD patients.

Paparrigopoulos et al, (2009), studied the relationship between sleep disturbance and depression in ESRD patients. He assessed 101 patients on hemodialysis with Athens Insomnia Scale (AIS). He assessed anxiety and depression with HADS and quality of life with SF – 36. Multiple regression analysis showed that presence of depression was an independent predictor of sleep disturbance among the patients.

Giovanni Merlino et al, (2006) studied 883 ESRD patients for the presence of sleep disorders. 69.1% of the study patients had insomnia. Restless leg syndrome (18.4%), obstructive sleep apnea syndrome (23.6%), excessive daytime sleepiness (11.8%) were the

other common sleep related disturbance noticed among the study population. Advanced age, dialysis shift in the morning , smoking and alcohol use were found to influence significantly the presence of sleep related disorders ($p<0.001$). In a study among Saudi Arabia ESRD patients, afternoon shift patients were observed to have greater sleep related problems (Hamdan H Al-Jahdali et al, 2010).

Elevated levels of orexin, have been studied as a etiological factor in the causation of sleep related disturbances (sugimoto T et al, 2002). Metabolic factors like anemia, pruritus, hypercalcemia, can also contribute towards sleep disturbance.

There are several other factors that cause insomnia. Azotemia have been found to significant relationship with sleep apnea syndrome which could destroy the quality of sleep (Milman et al, 1985). Though the exact mechanism could not be explained, increased interdialytic weight gain have been found to have an association with sleep problems. It can be possibly due to the increased intravascular volume, causing upper airway obstruction (Chiu et al, 2006). Significant physical comorbidities are an important causative factor for insomnia among ESRD patients (Mucsi et al, 2005). An interrelationship between restless leg syndrome and insomnia have been put forth by several studies (sabbtini et al, 2002). Old age, medication use and

other substance use are the few more important factors that will have to be considered (Yoshioka et al, 1993; Merlino et al, 2006;).

Iliescu EA et al, (2003), studied the relationship between the quality of sleep and quality of life of the hemodialysis patients. He used Pittsburgh Sleep Quality Index (PSQI) and Short Form Health Survey (SF – 36) to assess these parameters. 71% of the 89 study participants were found to have poor quality of sleep and these patients were found to have low scores on quality of life.

SEXUAL DYSFUNCTION:

Sexual dysfunction among ESRD patients is a very common impairment. Deranged renal status impairs spermatogenesis, disrupts hormone levels producing hyperprolactinemia, hypogonadism, changes in hypothalamic-pituitary axis etc. In spite of contributions from these biological derangements, there are also ample amount of psychological factor behind this. Depression, anxiety, social stressors, poor self esteem, body image disturbances all can contribute the sexual impairments produced in the ESRD patients (Kimmel.p et al, 1996; Kutner NG et al, 2004).

Yu Sen-Peng et al, (2005) studied the association of depressive symptoms, and sexual dysfunctions among male ESRD patients. He

studied 411 patients on hemodialysis with International Index of Erectile Function (IIEF), BDI, SF – 36. A linear multilinear regression analysis demonstrated increasing age and presence of depression as the two independent variables greatly influencing the presence of sexual dysfunctions in these patients.

In a study by Paulo S. Santos,(2012) sexual dysfunction among female ESRD patients were assessed. Female Sexual Function Index (FSFI) was used. Female patients within the age of 18 to 55 yrs who have been on dialysis for a minimum period of 3 months were considered for study. 79.3% of the patients presented with sexual dysfunction and these patients also had a poor quality of life, especially in the physical aspect.

Fryckstedt J et al (2008), studied 117 patients with ESRD to assess their sexual function. In this study patients sexual function were compared with pre and post dialysis state. Sexual dysfunctions in these patients were in the form of decreased desire (46%), problems with erection/lubrication (68%), decreased frequency of intercourse (64%). More than 50% of the patients accepted the fact that this impaired sexual function was impairing their quality of life. Sexual functions have been found to be impaired at desire, lubrication, frequency of intercourse and general satisfaction with sex. Most of the

studies came up with similar observation (Finkelstein F, 2007; Bellinghieri.G et al, 2008). Phosphodiesterase 5 inhibitors and oral zinc have been used for the treatment of these conditions with good results (Ivan Seibel et al, 2002). But adequate care must also be given to treat the psychological impairments in these patients so that the overall sexual satisfaction would be improved.

DIABETES AND PSYCHIATRIC MORBIDITY AMONG ESRD PATIENTS:

Among various variables that are found to impact the psychological health of ESRD patients, diabetes have been one important parameter. Prevalence of depression and anxiety were found to be high among diabetic ESRD population.

In the study by Araujo et al, (2011) 68 patients out of the 400 study participants were diabetic. Among the 68 patients, 28 patients were found to be depressed which was found to be statistically significant at $p<0.005$ level. In another study by Koo JR et al, (2003) diabetes were found to have higher BDI scores. There are also few studies that did not find a significant relationship between the presence of diabetes and psychiatric morbidity among ESRD patients.

ANXIETY AMONG ESRD PATIENTS ON MAINTENANCE HEMODIALYSIS:

Anxiety is also another more commonly prevalent psychological condition among hemodialysis patients but in comparison with depression the attention that anxiety disorders got was minimal. The study conducted by Daniel Cukor et al, (2007), had a standard equipment in the SCID to assess the patient instead of self assessment scales and the outcome of the study was that 27% of the study participants had some form of anxiety disorder ie. Panic with or without agoraphobia, PTSD, social phobia, obsessive compulsive disorder, or generalized anxiety disorder. In another study by Taskapan H et al, (2005), 12 out of the 40 ESRD patients on hemodialysis (27%) who participated in the study was diagnosed with anxiety disorder. In the same study the increased interdialytic weight gain was correlated with presence of depression and somatoform disorders and not with the presence of anxiety disorder but presence of any of these psychiatric disorders in this subset of people were found to grossly impair the quality of life as assessed by SF-36. when Cukor made a follow up of those patients after a period of 16 months, only 33% of the 12 patients diagnosed with anxiety disorder still carried the diagnosis.

In another study by Maurizio Bossola et al, (2010) where 80 patients were studied, 38 were identified with mild anxiety and 39 patients were diagnosed with moderate to severe anxiety. Hamilton anxiety rating scale was utilized to diagnose anxiety in the study group. Another study by the same author in2011, where he studied the relationship between the appetite and symptoms of anxiety and depression in ESRD patients, anxiety was noted in patients with poor appetite. Also the anxiety scores were found to correlate with age of the patient and comorbidities.

Aoife O Donovan et al in his study on the relationship between anxiety and inflammation, he studied around 56 patient divided into two groups as those with HADS-A score >8 and HADS-A score <8. The morning cortisol and IL – 6 levels and CRP levels were measured. A pattern with lower morning cortisol and increased IL-6 level were exhibited in the anxious group participants. This is more or less in accordance with the observation seen with chronic stress (Kiecolt-Glaser et al, 2003). But this observation needs further study and the exact role anxiety plays in the pathological process and outcome of ESRD patients have to be probed. In a systematic review of previous studies on dialysis patients to study the prevalence of various symptoms among the hemodialysis patients came up with fatigue,

pruritus, constipation as common symptoms, and anxiety was recorded in about 12% to 52% of the patients with ESRD.

Anxiety is a common symptom seen among dialysis patients, but the exact role on the treatment, survival of the ESRD patients is yet to be studied and documented fully. Anxiety has not received the king of attention, depression has received. While anxiety is also considered as a contributing factor for suicide risk along with depression, lot more studies will have to be conducted to document the deleritorious effects due to anxiety in these patients and the need to treat them.

QUALITY OF LIFE IN ESRD PATIETNS:

Quality of life is a very important faculty in chronic hemodialysis patients , as mere survival without it is going to be a futile exercise. Hence ensuring a better quality of life is of prime significance while treating a chronic illness like ESRD. Quality of life encompasses the overall functioning & well being of the individual, along with general health perception in domains like physical, psychological, and social. Factors like being a female sex, level of education, age, anemia, diabetes, depression and other comorbidites were found to have greater influence in determining the quality of life of the particular individual.

In a study by Tze Wah Kao et al (2009), conducted in northern Taiwan, study was conducted on 861 patients on hemodialysis at various centres, and they were screened with SF-36 and BDI. In the outcome of the study, depression was identified in 60.5% of the study participants. Depression and increased worries were negatively correlated with quality of life. Patients involving themselves in more number of social activities and having better monthly income were found to have better health related quality of life.

Kimmel P L et al (2003) studied 165 hemodialysis patients for the quality of life with Satisfaction with life scale (SWLS) and McGill Quality of life scale (MQOL). The mean treatment time for the participants on dialysis is 44 months. Their mean Hb was 11.8%, Albumin was 3.7 g/dl. This removes two important confounding factors out of question. Then he concluded that the presence of physical symptoms like pain were grossly impairing the quality of life. He also concluded patient perception is more important factor than the objective clinical measurements of the quality of life and psychosocial stressors and spirituality factors were important determinants of quality of life.

Ricardo Sesso et al (2003), studied the influence of socioeconomic status on the quality of life of the hemodialysis patients.

He evaluated 118 patients initially and later reassessed them after 7 months with SF 36. Classification of SES was based on the Brazilian Association of research institute criteria. The SF 36 score in all dimensions was found to be decreased in people from low socioeconomic status.

Maruschka.P.Merkus et al, (1997) compared the quality of life among hemodialysis patients and peritoneal dialysis patients. He scored them with SF 36 on patients, who are 3 months in to the dialysis. He concluded that patients on hemodialysis had a poor quality of life than the patients on peritoneal dialysis.

Fuensanta Moreno et al, (1996), in his study on 1013 ESRD patients measured the Hb level and found that the patients treated adequately with erythropoietin and had better Hb levels had better quality of life than those patients treated partially with erythropoietin. Similar result was also observed with few more studies. (Rosa Jofre, 2000).

Carole Loss et al, (2003) in his study conducted on patients recruited from 13 dialysis units in France, 169 patients were studied and compared with 169 age and sex matched non CRF controls for quality of life. He came up with an observation that when dialysis was

planned and explained to the patient and then taken up, the quality of life perception was good compared with other patients.

Samir.S.Patel et al, (2002), studied 53 HD patients to study the role of the spirituality in improving the quality of life, he came with an observation that male patients showed more spiritual involvement than women, though the prevalence of depression in men was more than the women, the perception of social support and quality of life was better with males than the females. Hence increased religious involvement is acting as a better coping mechanism in these patients.

R.N.Mi Rye Suh et al, (2002) studied 14 hemodialysis patients with anxiety and depression were put on a regular exercise program, 3 times a week for 12 weeks and was found that the depression and anxiety was found to improve and along with it the quality of life these patients also was found to improve. But this was found to be controversial as there are not much studies replicated and many had questioned its benefits.

TREATMENT OF THESE PSYCHIATRIC PROBLEMS IN ESRD PATIENTS:

Non pharmacological methods will have to be given priority while treating depression in ESRD patients, given the pharmacokinetic

and pharmacodynamic issues in these patients. Patients on chronic hemodialysis with depression when treated with cognitive behavior therapy have been found to give better symptom reduction with improved quality of life (Priscila Silveira Duarte et al, 2009; HenerT et al, 1996). Patients who participated in patient support groups have been found to have better survival status than non participants (Ronald Friend et al, 1986). In addition to these electroconvulsive therapy could also be an option but data on these are only limited. Psychopharmacological agents like SSRIs with the exception of paroxetine can be prescribed with minimal dose adjustment (Kalender B et al, 2007; Blumenfield M et al, 1997; Atalay.H et al, 2010). Otherwise SNRIs can be used with dose adjustments (Evi V.Nagler et al, 2012). With regard to anxiety, progressive muscle relaxation and other behavioral methods could be tried. Use of benzodiazepines must be last option, if at all needed, if so it must be at half the doses and never it must cross the 2/3rd of the maximum dose in normal patients. Treating these psychological impairments along with adequate care for treating anemia, diabetes, other comorbid conditions and psychosocial rehabilitation procedure have been found to improve the overall quality of life of the end stage renal disease patients on maintenance hemodialysis.

METHODOLOGY

AIM:

The aim of the study is to assess the prevalence of depression, anxiety and to study the level of perceived stress and quality of life among the hemodialysis population. The various variables that are found to contribute to these psychologic morbidities would also be studied.

OBJECTIVES:

1) to assess the prevalence of depression and anxiety among chronic hemodialysis patients
2) to quantify the severity of depression and anxiety among chronic hemodialysis patients
3) to assess the perceived stress level and quality of life of the patients on chronic hemodialysis
4) to study the relationship between the demographic variables and these psychiatric morbidities
5) to study the interrelationship between these psychiatric morbidities and various psychosocial factors.

To support these aims and objectives, the study design was planned based on hypothesis testing design, with the help of validated

structured tools and statistics. Participants of the study are chosen from the ESRD population who are on regular dialysis for a minimum period of 6 months and fulfill the inclusion and exclusion criteria.

INCLUSION CRITERIA:

a) ESRD patients between the age of 15 and 60 yrs on maintenance hemodialysis.
b) Minimum period for which the patients are on regular hemodialysis is 6 months.
c) Patients with hemoglobin level greater than 8 gms%.
d) Patients who give a valid consent and willing to participate in the study.

EXCLUSION CRITERIA:

a) past history of any primary psychiatric illness
b) Critically ill patients.
c) patients with dependence pattern of substance abuse within this past 6 months period

The following hypothesis were framed

1) Depression and anxiety is of greater prevalence among ESRD patients on maintenance hemodialysis

2) Depression and anxiety are more common among female than male ESRD patients
3) Patients from rural background have higher prevalence of depression and anxiety
4) Patients with high education have less incidence of depression and anxiety
5) Patients who feel that their support system is good have less psychiatric morbidities
6) Patients with the plan for renal transplantation in the future have better quality of life
7) Financial difficulty to meet the treatment expenses increases the incidence of depression, anxiety and impairs the quality of life
8) Diabetic patients on hemodialysis have greater prevalence of depression and anxiety
9) Higher the Perceived stress higher the prevalence of depression and anxiety with impairment in quality of life
10) Presence of depression and anxiety greatly impairs the quality of life

OPERATIONAL DESIGN:

The study was conducted in Government Rajaji Hospital, Madurai. Patients were recruited from the Nephrology OP, who

were on regular hemodialysis at various centers and attend the OP to collect drugs. Proper approval was obtained from the Institutional ethical committee for the study. The study was conducted from August 2011 to November 2012. All the patients were initially screened in order to verify whether they fulfill the inclusion criteria. The first sixty consecutive patients who fulfilled the inclusion and exclusion criteria of the study design were chosen. Each patient was explained about the study in detail. They were provided with a handout explaining about the purpose of the study. Patients who consented to participate, were asked to give a signed written consent. Every patient cooperated to spend time to answer the questionnaires.

STATISTICAL ANALYSIS:

Measures of central tendencies and the dispersion of the variables were studied using descriptive statistical methods such as mean, standard deviation. To study the relationship of the sociodemographic variables and the other variables used in our study, student ‘t’ test, ANOVA, and correlation analysis were performed. To understand the relationship between the independent variables and the chosen dependent variable multiple regression analysis was performed.

The above statistical procedure were performed by using SPSS software. ‘p’value of less than 0.05 was treated as significant.

TOOLS USED FOR THE STUDY:

PROFORMA:

Initial part of the proforma carries the patient identification details. Then the patient’s family history is recorded. Details about his hemodialysis like, the number of years he has been on dialysis, kind of IV access, frequency of dialysis in a week, distance to travel to reach the centre etc. Few study variables were enquired with a single question format. The details about their perceived family support were enquired in the form of a single question (eg. Do you feel that your family support is adequate - yes/ no). In the similar pattern, the patient’s financial difficulty was enquired through a question with three options like easy, moderate difficulty, severe difficulty. Their sexual life was enquired with the help of question that ‘Do they indulge in sex after being started with dialysis treatment’ – yes / no. The frequency with which the patients suffer from pulmonary edema secondary to volume overload was enquired. They were provided with three options like, often (4 and more than 4 times in a month), occasionally (between 1 and 3 times in a month) and never (not even once). Presence or absence of diabetes, other physical disorders also

were asked in the proforma. To measure parameters like depression and anxiety Hamilton Depression rating scale and Hamilton Anxiety rating scale was used. To assess the patients stress level and quality life, perceived stress scale and World Health Organization Quality of Life – short form (WHOQOL - BREF) was used. Columns were prepared in the proforma to mark the scoring for all these scales.

MODIFIED MINI:

Modified mini screen was used as a initial screening questionnaire to screen for psychiatric symptoms. The questions are based on gateway question and threshold criteria found in the Diagnostic and Statistical Manual IV (DSM – IV), the Structured Clinical Interview for Diagnosis (SCID), and the Mini International Neuropsychiatric Interview (M.I.N.I). It screens for mood symptoms, psychotic symptoms, and for various anxiety disorders. It consists of three sections which has to be answered in a yes or no pattern. Section 'A' screens for mood symptoms and it carries six questions. Section 'B' screens for various anxiety disorders and it has 9 questions. Section 'C' has 7 questions and it screens for psychotic symptoms.

HAMILTON DEPRESSION RATING SCALE (HDRS):

HDRS is a multiple item questionnaire, which is widely recognized, used to identify and quantify depression in individuals. It is designed to rate the severity by probing mood, feeling of guilt, suicide ideation, insomnia, retardation or agitation, anxiety, weight loss and somatic symptoms. Inter rater reliability has been found to be high with this scale. It consists of 17 items on which scoring are done. Eight items are scored on a five point scale, with 0 = not present to 4 = severe. Nine items are scored on a three point scale, i.e. 0 to 2. The total score obtained by adding up the score in each of the seventeen items provides the final score. The value between 0 to 7 shows absence of depression, 8 to 13 indicates mild depression, 14 to 18 indicates moderate depression, 19 to 22 indicates severe depression and 23 and greater indicates severe depression.

HAMILTON ANXIETY RATING SCALE (HARS):

HARS is a 14 item questionnaire, used to quantify anxiety in the patients. it is a 14 item scale which scores on various symptoms of anxiety. The items are defined by a series of symptoms, and measures both psychic anxiety and somatic anxiety. Scoring is done on a 5 point scale where it is scored between 0 and 4. Up to 13 indicates no anxiety,

<17 indicates mild anxiety, 18 to 24 indicates mild to moderate anxiety, and scores between 25 to 30 indicates moderate to severe anxiety.

PERCEIVED STRESS SCALE (PSS):

PSS is a useful scale that shows the level of perceived stress during the last month in a particular individual. The scale is easy to apply and is also easy for the patient to understand and answer as it offers simple questions. It is a measure of the degree to which the events in a particular individual's life are considered and perceived as stress. It enquires about the feelings and thoughts during the last month. Scoring is done on a 5 point scale, where 0 = never to 4 = very often. Arriving at a final score can be done by reverse scoring item 4, 5, 7, 8 in the scale (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0). Finally all the values are added up to attain the final score. The higher the score, the higher is the perceived stress level.

WHO QUALITY OF LIFE SCALE – BREF:

WHOQOL – 100 was designed to assess in detail the quality of life in several facets. But as it would be lengthy in several circumstances, WHOQOL – BREF was devised. It is appropriate to assess the quality of life of people suffering from chronic illness in

whom a cure is not possible and the illness can only be kept under control. It consists of 26 items, where first 2 questions assess the overall quality of life and the next 24 questions are derived from 24 facets contained in WHOQOL – 100. It is possible to determine four domain scores. The four domains are physical, psychological, social relationship, and environment. Scoring is done on a five point scale, with minimum being 1 and maximum being 5. Score for the questions 3, 4, 26 is obtained by subtracting the actual score from 6. Calculation of domain scores is as follows

Physical domain: (6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18

Psychological domain: Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)

Social relationship domain: Q20 + Q21 + Q22

Environment domain: Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25

Total score for quality of life is obtained by adding all the domain scores. Higher the score obtained, higher the quality of life.

LIMITATIONS OF THE STUDY:

1) Small sample size is a limitation of this study.

2) Cut off for hemoglobin level was placed at 8gms%. So anemia can have major impact on the psychological outcome. This cut off was chosen, as several patients were having hemoglobin level even lesser than this cut off.
3) Patients have been already on several drugs which can have an effect on the psychological profile of the patient.
4) No scales were used to quantify the sexual dysfunction, financial difficulty and sleep disturbance.

RESULTS AND INTERPRETATION:

TABLE - 1

SOCIODEMOGRAPHIC VARIABLES OF THE CHRONIC HEMODIALYSIS PATIENTS.

S.No	variables		Number of Patients	
			n	%
1	AGE	(< 35 yrs)	16	26.7
		(36 TO 55 yrs)	28	46.7
		>56 Yrs	16	26.7
2	SEX	Male	42	70.0
		Female	18	30.0
3	DOMICILE	Urban	26	43.3
		Rural	34	56.7
4	LITERACY	Illetrate	9	15.0
		Primary	14	23.3
		High school	16	26.7
		Higher sec	5	8.3
		college	16	26.7
5	MARITAL STATUS	Married	49	81.7
		Unmarried	8	13.3
		Widowed	2	3.3
		Separated	1	1.7
6	EMPLOYMENT	Unemployed	18	30.0
		Coolie work	13	21.7
		Employed	13	21.7
		Self business	16	26.7

The mean age of the study participants is 45.63 yrs. Range is 19 – 60 years

Table – 1 show that majority of the patients belong to the age group of 36 to 55 yrs (46.7%). 26.7% of the patients were in the age group between 56 to 60 years. Male patients constituted 70% (n = 42) of the study population. 34 out of 60 patients were from rural

background. 15% (n = 9) of the patients were illiterates, and 26.7% (n = 16) of the patients had college education. Rest of the patients (58.3%) had varying level of school education. Forty nine out of sixty patients were married, eight patients were unmarried. There were two widowed patients and one patient was separated from his wife on personal reasons. 30% of the patients were unemployed and 21.7% of the patients were coolie workers. 21.7% of the patients were employed in various institutions and 26.7% of the patients were looking after their own businesses.

TABLE – 2

DESCRIPTIVE STATISTICS OF THE VARIOUS STUDY VARIABLES

S.NO	VARIABLES		NUMBER OF PATIENTS	
			N	%
1	Duration of dialysis	< 1 year	28	46.7
		1 to 2 yrs	20	33.3
		> 2 yrs	12	20.0
2	Perceived family support	Adequate	49	81.7
		Inadequate	11	18.3
3	Transplantation plan in future	Yes	15	25.0
		No	45	75.0
4	Financial difficulty	No difficulty	9	15.0
		Moderate difficulty	33	55.0
		Severe difficulty	18	30.0
5	Diabetes	Yes	19	31.7
		No	41	68.3
6	Pulmonary edema	Often (>4 /month)	13	21.7
		Occasionally	25	41.7
		Absent	22	36.7

The table - 2 shows the descriptive statistics of the few study parameters among the study population. 46.7% (n = 28) of the patients have been on dialysis for the past 6 months to 1 year duration. 33.3% (n = 20) of the patients have been on dialysis treatment for 1 to 2 years duration. 20% (n = 12) of the patients have been on dialysis for greater than 2 years. Perceived family support was rated by patients as adequate or inadequate. 81.7% (n = 49) patients termed their family support as adequate while the rest of the patients (n = 11) claimed that the family support is inadequate. Fifteen out of sixty patients (25%)

have plans of renal transplantation in the future. Regarding financial difficulty as rated by the patients, 15% (n = 9) had no difficulty in meeting out the financial requirements for his treatment, 55% (n = 33) patients expressed moderate difficulty and 30% (n = 18) of the patients were unable to meet the expenses for the treatment. Nineteen out of the sixty patients (31.7%) are suffering with diabetes. 21.7% (n = 13) of the patients suffered from more than 4 episodes of pulmonary edema due to fluid overload in a month. 41.7% (25) patients also experience episodes of pulmonary edema but it occurs less than 4 times in a month.

TABLE – 3

PREVALENCE OF DEPRESSION AND ANXIETY AMONG THE STUDY PATIENTS.

S.NO	VARIBLES	SEVERITY	NUMBER OF PATIENTS	
			N	%
1	HDRS	No Depression	24	40.0
		Mild Depression	13	21.7
		Moderate Depression	11	18.3
		Severe Depression	5	8.3
		Very Severe Depression	7	11.7
2	HARS	No Anxiety	47	78.3
		Mild Anxiety	5	8.3
		Moderate Anxiety	6	10.0
		Severe Anxiety	2	3.3

Table 3 shows the prevalence of depression and anxiety among the study patients based on HDRS and HARS. 60% (n = 36) patients suffered from depression of varying severity. Of which mild depression was seen in 21.7% (n = 13), moderate depression was seen in 18.3% (n = 11), severe depression was seen in 8.3% (n = 5) and very severe depression was seen in 11.7% (n = 7) of the patients.

Anxiety was seen in 21.7% (n = 13) of the patients. in which 8.3% (n = 5) had mild anxiety symptoms, 10% (n = 6) had moderate anxiety symptoms and 3.3% (n = 2) had severe anxiety features.

TABLE – 4

RELATIONSHIP BETWEEN DEPRESSION, ANXIETY AGAINST SELECTED DEMOGRAPHIC VARIABLES.

s.no	Variables	Category	N	HAM - D			HAM - A		
				Mean	SD	F value	mean	SD	F value
1	AGE	<35	16	10.94	8.338	.583	8.56	8.382	.213
		36 TO 55	28	13.54	7.671		9.86	6.323	
		>55	16	13.50	8.944		10.00	7.052	
2	EDUCATION	Illiterate	9	19.00	6.652	2.627*	13.78	5.932	1.519
		Primary	14	13.86	8.226		10.00	7.211	
		High school	16	12.81	8.018		9.25	6.678	
		Higher sec	5	12.00	3.606		10.40	4.278	
		college	16	8.75	8.299		6.81	7.799	
3	Employment	Unemployed	18	14.67	9.223	1.228	11.61	8.304	1.166
		Agri worker	13	14.85	7.744		10.46	7.523	
		Employed	13	10.23	6.340		7.69	4.889	
		Self employ	16	11.25	8.250		8.00	6.282	
4	Duration of Dialysis	< 1 yr	28	11.07	8.087	2.636	8.75	6.829	1.425
		1 – 2 yrs	20	16.15	7.506		11.65	7.471	
		> 2 yrs	12	11.42	8.218		7.92	6.345	

* statistically significant at P<0.05

The age group of <35 yrs has a mean HDRS score of 10.94 while the >35 yrs had an mean score of 13.50. Hence depression was found to be higher with increasing age but the difference was not statistically significant. Lower education was found to have a greater relationship with the prevalence of depression among the patients as the F value of 2.627 was found to be statistically significant ($p<0.05$). Employment status of the patients did not show any relationship with

the incidence of depression in these patients. But the unemployed population had a higher mean HDRS score than the rest of the occupation groups. Duration of dialysis was not found to have any significant relationship with the occurrence of depression in these patients.

On the relationship between anxiety and various demographic profiles, marginally higher anxiety scores were recorded among patients in the >55 age group. Illiterate patients were found to have higher anxiety scores than the patients with higher education. Unemployed patients scored high on anxiety while compared with the patients involved with any form of work. Among the groups based on duration of dialysis, patients in the group of 1- 2 yrs had higher anxiety scores. But none of these relationships were found to be at a statistically significant level.

TABLE – 5

RESULTS FOR THE PERCEIVED STRESS LEVEL AND QUALITY OF LIFE BASED ON SELECTED DEMOGRAPHIC VARIABLES.

s. no	Variables	Category	N	PSS			WHO QOL		
				Mean	Std deviation	F value	Mean	Std deviation	F value
1	Age	<35	16	17.19	9.840	1.082	55.5625	18.28194	2.015
		36 TO 55	28	20.14	8.209		45.4554	18.07956	
		>55 yrs	16	21.63	8.531		44.4219	17.41784	
2	Education	Illiterate	9	27.33	4.873	2.879*	27.1667	10.61617	5.209**
		Primary	14	20.21	8.541		45.8393	18.56967	
		High school	16	19.06	9.794		51.4688	16.54712	
		Higher sec	5	19.80	4.817		51.3500	6.26149	
		college	16	15.75	8.466		56.6250	17.57271	
3	Employment	Unemployed	18	21.50	8.713	.901	44.5972	20.20067	1.447
		Agri worker	13	21.62	7.676		41.9423	15.78308	
		Employed	13	17.62	9.124		54.8846	14.21326	
		Self employ	16	18.00	9.395		50.6875	19.87136	
4	Duration of Dialysis	< 1 yr	28	18.54	8.996	.994	50.1250	19.31099	1.377
		1 – 2 yrs	20	22.00	8.310		42.4375	16.28849	
		> 3 yrs	12	18.83	8.943		51.6875	18.27260	

* Statistically significant at P<0.05

** Statistically significant at p<0.001

Table - 5 shows the following relationships between the perceived stress level and quality of life against various demographic datas. One way ANOVA was done to study the relationship between these multiple variables. Higher the age, higher were the perceived stress level. Unemployed and coolie workers were found to have higher perceived stress scores. Stress was observed to be high among

the patients in the group of 1 -2 yrs with regard duration of dialysis. None of the above mentioned observation were found to be statistically significant ($p<0.05$). patients with lower education, were observed to have higher stress level and this finding was statistically significant with a F value of 2.879 and $p<0.05$.

Education status of the patients have been found to greatly influence the quality of life of these patients. The relationship between these two parameters were observed to be statistically significant with a F value of 5.209 and $p = 0.001$. Increasing age and unemployment were observed to decrease the quality of life of hemodialysis patients, but they were not up to the level of statistical significance. Duration of dialysis was not found to have any impact on the quality of life of these patients.

TABLE – 6

RESULTS FOR THE DEPRESSION AND ANXIETY BASED ON SELECTED DEMOGRAPHIC VARIABLES.

s. no	Variables	Category	N	HAM - D			HAM - A		
				Mean	Std deviation	't' value	Mean	Std deviation	't' value
1	Sex	Male	42	12.21	8.389	-.898	8.90	7.217	-1.091
		female	18	14.28	7.560		11.06	6.449	
2	Domicile	Urban	26	13.38	9.567	.456	10.50	8.515	.916
		Rural	34	12.41	6.981		8.82	5.633	
3	Dialysis Frequency	Once a week	5	20.80	12.112	2.374*	15.00	9.747	1.852*
		Twice a week	55	12.11	7.425		9.05	6.609	
4	Transplant plan	Yes	15	11.13	8.551	-.933	9.13	8.535	-.264
		no	45	13.40	8.018		9.69	6.533	

* Statistically significant at P<0.05

Table – 6 shows the't' test results done to study the relationship between depression and anxiety against variables like sex, domicile, dialysis frequency and transplant plan in the future. Female patients were found to have marginally higher mean HDRS and HARS scores (14.28 vs 12.21; 11.06 vs 8.90). But neither of these values were found to have statistical significance. People form urban area were found to be slightly more depressed compared to patients from rural background (13.38 vs 12.41), with a 't' value of 0.456. Similarly, people from urban area were found to be more anxious than rural patients (10.50 vs

8.82), with a ‘t’ value of 0.916. Both the above mentioned observations were not found to be statistically significant at $p<0.05$ level. People on dialysis once in a week were found to be more depressed (20.80 vs 12.11), with a ‘t’ value of 2.374. This value was observed to be statistically significant ($p<0.05$). Similarly patient on once a week dialysis were found to be more anxious (15.00 vs 9.05), with a ‘t’ value of 1.852. This observation was not found to be statistically significant at $p<0.02$ level. No statistically significant relationship was observed between, the group with the transplantation plan in the future and the group with no such plans in the future with regard to the level of depression or with anxiety. Still, mean value for depression and anxiety were high among patient group without any transplantation plan in the future.

TABLE – 7

RELATIONSHIP BETWEEN PERCEIVED STRESS, QUALITY OF LIFE AND DEMOGRAPHIC VARIABLES.

s. n	Variables	Category	N	PSS			WHO QOL		
				Mean	Std deviation	't' value	Mean	Std deviation	't' value
1	Sex	Male	42	19.29	9.610	-.624	48.4226	19.71353	-.517
		female	18	20.83	6.474		46.5972	14.78153	
2	Domicile	Urban	26	19.08	9.570	-.517	48.6058	19.82084	.269
		Rural	34	20.26	8.199		47.3162	17.27127	
3	Dialysis Frequency	Once a week	5	25.60	10.900	1.579*	37.8500	30.85835	-1.289*
		Twice a week	55	19.22	8.463		48.7864	16.85054	
4	Transplant plan	Yes	15	16.53	10.134	-1.666	57.0500	18.48267	2.329*
		no	45	20.82	8.097		44.8167	17.33612	

* Statistically significant at P<0.05

Table - 7 shows the relationship between perceived stress and quality of life and demographic variables. The mean score for PSS (19.29 vs 20.83) and WHO QOL (48.42 vs 46.59) did not show much difference between males and females. The urban group of patients and rural patients did not show significant difference in the mean value of PSS (19.08 VS 20.26) and WHOQOL (48.60 vs 47.31). All the above mentioned observations did not show any statistical significance. The patients on once a week dialysis schedule have been found to have high perceived stress level (25.60 vs 19.22) and low quality of life

(37.85 vs 48.78). Their ‘t’ values have been 1.579 and -1.289 respectively. This observation was found to be of statistically significant at $p < 0.05$. The group of patients with renal transplantation plan in the future were found to be less stressed than the other group of patients. The mean PSS score for the group with transplantation plan in the future was 16.53 against the 20.82 of the group of patients without such plans in the future. But this did not gain statistical significance. The mean quality of life score of the patients with transplantation plan in future was higher (57.05 vs 44.81) with ‘t’ value of 1.329. This finding was found to be of statistical significant ($p<0.05$).

TABLE – 8

RELATIONSHIP BETWEEN DEPRESSION, ANXIETY AND FEW STUDY VARIABLES

S. no	Variables	Category	N	HDRS			HARS		
				Mean	Std deviation	't' value	Mean	Std deviation	't' value
1	Perceived family support	Adequate	49	11.71	7.433	-2.330*	8.47	6.182	-2.644*
		inadequate	11	17.82	9.611		14.36	8.686	
2	Diabetes milletus	Yes	19	15.63	8.883	1.849	12.79	6.646	2.547*
		No	41	11.54	7.537		8.05	6.734	
3	Suicidal ideas	Yes	18	22.50	5.752	9.615**	16.61	7.039	6.778**
		No	42	8.69	4.801		6.52	4.352	
4	Sexual history	Yes	15	8.27	4.621	-2.632*	6.07	5.216	-2.301*
		No	45	14.36	8.520		10.71	7.194	

* Statistically significant at P<0.05

** Statistically significant at p<0.01

Table – 8 shows the relationship between the level of depression and anxiety against selected variables. The patients who perceived their family support as inadequate were found to be more depressed and anxious. Their mean values of the HDRS of the patients who felt that their family support adequate and inadequate were 11.71 vs 17.82 with 't' value of -2.330. It was found to be statistically significant at p<0.05 level. The mean values of HARS of patients with adequate or

inadequate family support were 8.47 vs 14.36 with ‘t’ value of -2.644. This observation was found to be statistically significant at $p<0.05$ level. The mean score for depression and anxiety of patients with diabetes were found to be higher than non diabetic group (15.63 vs 11.54; 12.79 vs 8.05). But the relationship between anxiety and diabetes mellitus has ‘t’ value of 2.547, which is found to be statistically significant ($p<0.05$). The patients with suicidal ideas were found to have higher HDRS score (22.50 vs 8.69) and HARS score (16.61 vs 6.52). Their ‘t’ values have been 9.615 and 6.778 respectively. These two relationships have been found to be highly significant ($p<0.001$). Patient who do not have sexual intercourse with their life partners have been observed to have high mean values of HDRS & HARS (14.36VS 8.27; 10.71 vs 6.07) with ‘t’ value of -2.632 and -2.301 respectively. These two values have been found to be statistically significant ($p<0.05$).

TABLE – 9

RELATIONSHIP BETWEEN PERCEIVED STRESS LEVEL, QUALITY OF LIFE AND FEW STUDY VARIABLES

s. no	Variables	Category	N	PSS			WHO QOL		
				Mean	Std deviation	't' value	Mean	Std deviation	't' value
1	Perceived family support	Adequate	49	18.45	8.399	-2.537*	50.5969	16.93991	2.547*
		inadequate	11	25.55	8.311		35.7500	19.83841	
2	Diabetes milletus	Yes		22.47	9.324	1.664	41.2500	20.99239	-1.958
		No		18.49	8.304		50.9451	16.23061	
3	Suicidal ideas	Yes	18	29.33	5.821	7.949**	28.0417	13.65145	-7.828**
		No	42	15.64	6.231		56.3750	12.50052	
4	Sexual history	Yes	15	13.40	5.767	-3.545**	61.7500	10.08225	3.755**
		No	45	21.87	8.604		43.2500	18.10104	

* Statistically significant at P<0.05

** Statistically significant at p<0.01

Table – 9 shows the relationship between perceived stress level and quality of life against selected variables. The group of who felt that their family support is inadequate was found to have more perceived stress with poor quality of life . The mean PSS score of patients who perceived their family support as inadequate was 25.55 against the 18.45 of adequate group. The mean value of quality of life score is low in inadequate family support group (35.75 vs 50.59). Both these

observations were found to be statistically significant at $p<0.02$ level. The diabetic patients had high stress level (22.47 vs 18.49), with low quality of life (41.25 vs 50.94). These observations did not reach a statistically significant level. The patients with suicidal ideas have high stress level (29.33 vs 15.64) and low quality of life (28.04 vs 56.37). The 't' value is 7.949 and -7.828 respectively. This finding has been statistically highly significant ($p<0.001$). 45 patients out of the 60 have said that they did not have sexual intercourse with their life partners after being initiated on dialysis. The patient group which has a sexual life has been found to have less stress level (13.40 vs 21.87) and high quality of life (61.75 vs 43.25). Both of these observations are found to be statistically highly significant ($p<0.001$).

TABLE – 10

RELATIONSHIP BETWEEN DEPRESSION, ANXIETY AND FEW STUDY VARIABLES

S.no	Variables	category	N	HAM - D			HAM - A		
				Mean	SD	F value	Mean	SD	F value
1	Financial difficulty	Easy	9	5.33	2.500	13.843**	4.00	2.828	6.464*
		Mod diff	33	11.45	6.774		9.03	5.919	
		Very diff	18	19.11	8.094		13.28	8.330	
2	Pulmonary edema	Often	13	18.15	9.685	8.826**	13.08	9.050	5.265*
		Occasionally	25	14.28	7.754		10.72	6.586	
		Absent	22	8.05	4.456		6.14	4.497	

* Statistically significant at P<0.05, ** Statistically significant at p<0.01

Table - 10 shows one way ANOVA results for the relationship between depression and anxiety against the selected variables. The patients who have been financially difficult situation to meet out their expenditure for treatment were found to be highly depressed (19.11 vs 5.33) with a 'F' value of 13.843. This observation were found to be statistically significant (p<0.001). Similarly patients with financial difficulty have more anxiety with a 'F' value of 6.464. This finding was statistically significant at p<0.05 level. Patients with frequent episodes of pulmonary edema, was highly depressed (18.15 vs 8.05) and anxious (13.08 vs 6.14). These two observations are found to be statistically highly significant.

TABLE – 11

RELATIONSHIP BETWEEN PERCEIVED STRESS LEVEL, QUALITY OF LIFE AND FEW STUDY VARIABLES

S. no	Variables	category	N	PSS			WHO QOL		
				Mean	SD	F value	Mean	SD	F value
1	Financial difficulty	Easy	9	12.44	4.187	11.236**	62.4444	8.60394	10.779**
		Mod diff	33	18.27	7.950		51.1136	15.95160	
		Very diff	18	26.11	7.992		34.6528	18.07137	
2	Pulmonary edema	Often	13	24.38	9.929	5.394**	35.1923	20.39152	7.946**
		Occasionally	25	21.08	7.947		45.8700	15.01668	
		Absent	22	15.50	7.269		57.6477	15.42332	

** Statistically significant at $p<0.01$

Table - 11 shows one way ANOVA results to study the relationship between perceived stress and quality of life against selected variables. The patients with high financial difficulty to meet their medical expenditures are found to be highly stressed compared with no financial difficulty patients (26.11 vs 12.44). The 'F' value is 11.236 which is statistically highly significant ($p<0.001$). Financially stressed patients also have a very poor quality of life (34.65 vs 62.44), with a 'F' value of 10.77. This observation is found to be highly significant ($p<0.001$). patients with frequent episodes of pulmonary edema are highly stressed (24.38 vs 15.50), with poor quality of life (35.19 vs 57.64). Their 'F' values have been 5.394 and 7.946 respectively. These findings are statistically significant at $p<0.01$ level.

TABLE – 12

REPRESENTATION OF RELATIONSHIP BETWEEN QUALITY OF LIFE AND STUDY VARIABLES:

	WHO Domain 1	WHO Domain 2	WHO Domain 3	WHO Domain 4	WHO Total
AGE	-.243	-.162	-.185	-.128	-.193
LITERACY	.427**	.430**	.345**	.472**	.465**
DIALYSIS DURATION	-.103	-.048	.072	-.141	-.082
SLEEP DISTURBANCE	.477**	.439**	.432**	.506**	.506**
HDRS	-.807**	-.788**	-.773**	-.815**	-.864**
HARS	-.717**	-.696**	-.668**	-.688**	-.752**
PSS	-.844**	-.855**	-.720**	-.846**	-.899**

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)

Table – 12 sho ws the correlations between quality of life and study variables. Age is found to be negatively correlated with quality of life. Higher the age, the quality of life in all domains are found to be decrease, but it did not gain statistical significance. Education is found to positively correlated with quality of life and is of high statistical significance ($p<0.01$). Duration of dialysis did not show significant

correlation with the quality of life. But all domains except social relationship domain are negatively correlated. Sleep is found to be positively correlated with quality of life and this relationship is found to be statistically significant ($P<0.01$). The values of HDRS, HARS, PSS are found to be negatively correlated and this relationship is found to be statistically significant ($P<0.001$).

TABLE – 13

MULTIPLE LINEAR REGRESSION ANALYSIS:

S.NO	VARIABLES	R	R Square	Adjusted R Square	R Square Change	F Change	Sig. F Change
1	PERCEIVED STRESS	.892(a)	.795	.792	**.795**	224.990	.000
2	DEPRESSION	.916(b)	.839	.834	**.044**	15.674	.000

Multiple linear regression analysis was done to find out which independent variables are contributing for dependent variable. Dependent variable was taken as Quality of life. Independent variables that were considered are age, duration of dialysis, HDRS, HARS, and PSS. Perceived stress level was found to contribute 79.5% towards the quality of life. Hence perceived stress level is found to have highest impact on the quality of life on comparison with other variables like depression, anxiety, age, duration of dialysis.

The regression equation is

Quality of life = 82.398 + (-1.187)PSS + (-0.864) HDRS

DISCUSSION

The study aimed to know the prevalence of depression and anxiety disorders among the ESRD patients on maintenance hemodialysis. It also intends to study the various factors that contribute towards these psychological morbidities. The study was done on the native populations who were attending the Nephrology OPD, and has been on regular hemodialysis. The first 60 patients who fulfilled the inclusion criteria were taken up for the study. A written consent was obtained from all the study participants who accepted to participate in the study.

The study group was composed of more number of male patients (n=42), than female patients (n=18). Nearly half of the patients (46.7%) are in between the age group of 36 and 55 yrs and 26.7% of the patients are below 35 yrs and another 26.7% above 56 yrs of age.

The prevalence of depression among the ESRD patients on hemodialysis, according to the present study is, 21.7% (n=13) had mild depression, 18.3% (n=11) had moderate depression, 8.3% (n=5) had severe depression, and 11.7% (n=7) had very severe depression. In total, 60% (n=36) had depression of varying severity. In a study done by Taskapan et al (2005), HDRS and HARS were used to measure

depression and anxiety and the outcome of the study was, 35% of the study participants were diagnosed with depression. The prevalence of depression among HD patients according to various studies were identified as 60.5% (Kao et al, 2009), 52.5% (Bossola et al, 2010), 50% (Montinaro et al, 2010), 40.2% (Keskin & Engin, 2011). In majority of the other studies the prevalence of depression was identified to be between 20 and 35%. Most of the studies used Becks depression inventory or Hospital Anxiety Depression scale to identify depression among HD patients.

The prevalence of anxiety disorder in the present study was about 21.7% (n=13). Among which 8.3% (n=5) scored for mild anxiety, 10% (n=6) had moderate anxiety, and 3.3% (n=2) had severe anxiety. The outcome of the study conducted by Chen et al (2010), was in conformation with our study where they diagnosed anxiety in 21% of the 200 study participants. Taskapan et al (2005), used the same tool (HARS) to measure anxiety disorders and identified anxiety in 35% of the study participants. In a study by cukor et al (2007), anxiety disorder was diagnosed in 27% of the study participants. In a study by Montinaro et al (2010), anxiety disorder was diagnosed in 43% of the study participants.

In this study, age is not found to have any significant influence on the prevalence of depression, anxiety or the quality of life of these patients. Though the mean value of the HAM –D, HAM – A, PSS was found to be higher in the older age group, they weren't to the quantum of statistical significance. The study by Nancy G.Kutner et al (2000) conducted on older hemodialysis patients, did not find any significant correlation with age and depression or life satisfaction in those patients. Taskapan et al (2005) also did not find any relationship between age and psychiatric morbidity among ESRD patients. But depression was found to be increasing with increasing age in the study by Keskin & Engin, (2011). The prevalence of depression was found to be more among old age patients in the study by Araujo et al (2011), with the average age of the depressive patients being 55.7 against 50.6 in nondepressive patients. In a study by Drayer et al, he concluded that depressed patients are of younger age and has low quality of life.

Gender as a factor in predicting psychiatric morbidity did not receive support in our study. Though there was a higher mean value with regard to females, they weren't to the level of statistical significance. In the study by Araujo et al (2011), females were found to have greater prevalence of depression . Gender differences were found

to have no impact on the level of depression, anxiety in few studies (Miro Klaric et al, 2009; Taskapan et al, 2005)

Education as an influencing parameter in the prevalence of these psychological morbidities was studied. A statistically significant relationship was observed with regard to depression, perceived stress level and quality of life.. Higher the education the lesser is the prevalence of depression, anxiety and perceived stress level. The quality of life is found to be better among educated people. Araujo et al, (2011), in his study on 400 HD patients concluded that the lower the education, higher the level of depression in these patients. Taskapan et al, (2005) concluded that education has no influence over the prevalence of depression.

Employment as a determining factor was studied, and this study did not provide any statistically significant relationship with regard to depression, anxiety or perceived stress level. But the unemployed population had a higher mean value of HDRS, HARS and PSS than the employed group. Taskapan et al (2005), found similar observation in his study. But there has been studies that claim on the contrary. Araujo et al, (2011), in his study pointed out that the unemployment rate among depressed and nondepressed population as 93.5% vs 6.5%. In

another study by Salwa Ibrahim et al, (2008), all the patients with BDI score >15 were found to be unemployed.

In this study, duration of dialysis was not found to have a significant relationship with depression, anxiety, perceived stress and quality of life. Several other studies also did not find a significant relationship between duration of dialysis and psychiatric morbidities (Wolcott et al, 1988; Cukor et al, 2007; Taskapan et al, 2005; Koo JR et al, 2003).

In this study, urban and rural patients are grouped separetly and is studied to find any significant relationship. The urban group of patients was found to have slightly higher mean value of depression and anxiety scores but this difference was not found to be of statistically significance ($p<0.05$). The perceived stress level and quality of life scores did not show significant difference in their mean values. There have been not many studies that assessed the difference in prevalence of psychiatric morbidity in ESRD patients under the rural urban divide. Rural patients have several adverse factors that can increase the prevalence of psychiatric morbidities (lesser education, financially stressed, lesser job opportunity etc). But there has not been much difference in the occurrence of psychological disturbances within these two groups in this study.

In this study, people who have been undergoing dialysis once a week and people undergoing dialysis twice a week were grouped separately and was analyzed. The people in the once a week group was small in number (n=5). The people in the once a week group is found to have high perceived stress level with a poor quality of life and this difference was found to be statistically significant ($p<0.02$). This observation could be due to several biological and psychosocial parameters. Patients opt for a weekly once schedule as they couldn't afford for twice a week dialysis. In such case, financial difficulty itself puts the patient in a highly stressed position, which predisposes the individual to psychiatric morbidities. Another aspect is that the build up of urea and creatinine reaches high levels before the dialysis. Azotemia due to the delay in dialysis also predisposes the individual to depression and anxiety disorders. Other studies on the ESRD patients were conducted on people who have been on regular dialysis at a frequency of thrice or twice a week.

People with the plan of renal transplantation in the future was found to be more optimistic, less depressed with a low mean HDRS score and a higher mean quality of life score, but these differences aren't statistically significant. There have been studies which compared the prevalence of psychiatric morbidity among hemodialysis

patients and those who underwent renal transplantation. Kalman TP et al (1983) in his study, studied these two groups using General Health Questionnaire and concluded that the psychiatric morbidity in these two group of patients is the same. 46% of the transplant group and 48% of the dialysis group was identified to have some kind of psychiatric morbidity. Several studies identified that, renal transplantation patients definitely has an psychological edge over the long term hemodialysis patients (Sensky T, 1989; Keith Petrie, 1989). In a study by R Karaminia, Tavallaii SA, et al (2007), he concluded that anxiety was high among the dialysis patients compared with transplant patients and no significant difference with depression score was noted.

Hemodialysis patients with diabetes in this study are not found to have a significant relationship with the presence of depression. But the mean score of HDRS of diabetic patients was found to be higher than the non diabetic group. The perceived stress level is also found to be high with impaired quality of life among this population. Presence of diabetes among ESRD patients is found to have a significant effect ($p<0.02$) on the anxiety level of the patient. According to the study by Araujo et al, (2011), out of the 68 patients found to have depression out of the 400 study participants, 28 patients were found to be diabetes. In

the study by Koo JR et al (2003), diabetic patients were found to have a higher BDI scores.

In our study, presence of depression and anxiety was found to have strong association with the presence of suicidal ideas. This subset of patients who has suicidal ideas has a higher perceived stress level with poor quality of life. All these relationships is found to have a statistically highly significant relationship ($p<0.001$). Depression as a leading cause of suicide is a well studied fact. In a study by Soykan et al (2003), high rates of suicidal ideas and attempts were seen among ESRD patients. He also observed that the suicidal behavior is more prevalent in single or divorced population and in patient group whose satisfaction with life is decreased and who feels that their social support system is poor. Sareen J et al (2005), concluded in his study that anxiety disorder is an independent risk factor for subsequent onset of suicidal ideas. The patients with depression and anxiety disorder together have been found to predict the suicidal risk better than depression alone.

Sexual life among ESRD patients has been found to be greatly affected. In this study, patients were asked the question of whether they had sexual intercourse after being started with dialysis. 45 patients (75%) did not have sexual intercourse after being started with dialysis.

This was found to have significant relationship with the depression in these patients ($p<0.02$). Statistically significant relationship was also noted between the impaired sexual life and the high perceived stress and lowered quality of life of these patients ($p<0.001$). In a study by yu sen-Peng et al (2005), presence of depression was studied as an independent variable having the maximum influence on sexual dysfunction in ESRD Patients. In a study by Paulo S.Santos (2012), conducted on female ESRD patients, 79.3% presented with sexual dysfunction and this group of patients was found to have poor quality of life, especially in the physical domain. Fryckstedt J et al (2008), in his study found that all stages of the sexual function get impaired in ESRD patients and it has an adverse effect on the quality of life of these patients.

The patient's financial difficulty to meet the requirements for treatment was found to have the biggest quantum of impact on the patient's psychological profile. Depression and anxiety is found to be prevalent in greater proportion among patient's with financial difficulty in meeting their treatment expenses. They experienced high stress level with impaired quality of life. All these observations has been found to be statistically significant ($p<0.005$). Taskapan et al (2005), in his study did not find any significant relationship between

the socio economic status and psychiatric morbidity in ESRD patients. Ricardo sesso et al (2003), found that people from low socioeconomic status had poor quality of life.

Patients with poor perceived family support is found to have higher prevalence of depression, and anxiety. They experienced high stress level with poor quality of life. In our study all these relaitonships are found to be statistically significant ($p<0.05$). In a study by Christensen AJ et al (1989), 63 patients were studied with Family Environment Scale. Family relationship index was derived and he found that patients with better family support suffered lesser psychiatric morbidity with improved quality of life. Lack of family support was found to increase suicide rates among ESRD patients (Abram et al, 1971).

The patients with frequent episodes of pulmonary edema, due to volume overload have been found to have a significant impact on the psychiatric morbidity of the hemodilaysis patients. They are found to be more depressed and anxious. Their perceived stress level is also high with impaired quality of life. All these observations are found to be statistically significant at $p<0.01$ level. In a study by Kimmel PL (2000), interdialytic weight gain was found to predict increased mortality among diabetic ESRD patients. In another study by Taskapan

et al (2005), depressed patients were found to have high interdialytic weight gain.

Quality of life is a parameter which has to be given greater importance in patients with chronic illnesses. In our study when multiple linear regression analysis was done, the patients perceived stress level was found to be the biggest independent influencing factor on the quality of life of ESRD patients. Depression came as the distant second influencing factor. Hence adequate consideration must be given to assess the patient's perceived stressors, as they have a direct impact on the quality of life of these patients. In a study by Tsai YC, (2009), he studied 423 patients, and they were followed up for a median period of 410 days. He used WHOQOL – BREF scale for the study. He concluded that the scores of the physical and psychological domains and the total scores significantly correlated with increased risks of death among CKD patients. He insisted that QOL of life is an independent predictor of mortality in ESRD patients.

In this study, ESRD patients with depression did not have any statistically significant relationship with respect to gender, sex, domicile, employment status, and duration of dialysis. But depressed ESRD patients has statistically significant relationship with education status. Dialysis frequency in a week, perceived family support,

financial difficulty, frequent episodes of pulmonary edema, suicidal ideas and impaired sexual function are found to have a significant relationship with the presence of depression, anxiety, perceived stress level and quality of life. Many of these parameters has been enquired in a single question format, hence a detailed study involving these parameters will be needed in the future to validate these results.

Anxiety disorders among ESRD patients are found to be influenced by the gender, and diabetic status of the particular individual. Education is found to significant relationship with the perceived stress level, (patients with higher education has less perceived stress level) and the quality of life. Patients with plans of renal transplant in the future are found to have a better quality of life than the other group, who don’t have such plans.

CONCLUSION

The study findings reveal with respect to the hypothesis that

1) Depression and anxiety is of greater prevalence among ESRD patients on maintenance hemodialysis
2) Gender difference with the regard to the prevalence of depression and anxiety among ESRD patients is not to statistically significant levels
3) Patients either from rural or urban background is not found to have significant difference in the prevalence of depression or anxiety in ESRD patients
4) Patients with lower education are found to have significantly higher prevalence of depression.
5) Patients who feel that their family support system is inadequate has significantly higher prevalence of psychiatric morbidities with poor quality of life
6) Patients with the plan of renal transplantation in future is found to have significantly better quality of life compared with the group with no such plans
7) Patients who struggle financially to meet their treatment expenses is significantly more stressed with increased incidence of depression and anxiety.

8) Diabetic patients on hemodilaysis are found to have significant higher prevalence of anxiety but not depression.

9) Higher the perceived stress, significantly higher the prevalence of depression and anxiety with impaired quality of life

10) Presence of depression and anxiety significantly impairs the quality of life of these patients.

The present study clearly points to the fact that the prevalence of depression and anxiety among ESRD patients. The presence of these psychiatric morbidities is found to impair the quality of life to a greater extent. While studying the relationship with the sociodemographic and other variables, lower the education, lesser frequency of dialysis, inadequate perceived family support are found to significantly predispose the individual to psychiatric morbidity. The perceived stress level as the predominant independent factor in determining the quality of life stresses on the fact, stress coping mechanisms of these patients has to be probed upon. Considering the quantum of impairments these psychological morbidities produce on the patients, probably vigorous screening for these ailments with adequate treatment plans can ensure a better quality of life in these patients.

Future studies can be aimed at assessing the relationship between personality profile, stress coping , psychiatric morbidity and sexual functioning in large sample of ESRD patients and to compare with the native population. This will throw more insight in their psychological functioning and quality of life so that effective counseling can be given to improve their coping skills which will significantly improve their ability to handle their physical illness.

BIBLIOGRAPHY

1) Abram.H.S, Moore. G.L, Westervelt, F.B.; Suicidal behavior in chronic dialysis patients. Am. J. Psychiat. (1971) 127: 119-127.

2) Agarwal, S., Gollapudi, P., Elahimehr, R., Pahl, M.V. & Vaziri, N.D. (2010). Effects of endstage renal disease and haemodialysis on dendritic cell subsets and basal and LPSstimulated cytokine production. *Nephrol. Dial. Transplant.* 25 (3): 737-746.

3) Alleyne S, Reiss D, Leonard KJ, et al: (1996), Staff security and work pressure: Contrasting patterns of stability and change across five dialysis units. *Soc Sci Med* 43:525–535.

4) Aoife O'donovan,, Hughes, B.M., Slavich, G.M., Lynch, L., Cronin, M.T., O'farrelly, C., et al. (2010). Clinical anxiety, cortisol and interleukin-6: evidence for specificity in emotion-biology relationships. *Brain Behav Immun*, 24, 1074-1077

5) Araujo SM, De Bruin VM, Daher Ede F,. et al; Risk factors for depressive symptoms in a large population on chronic hemodialysis. *International Urology and Nephrology*. 2012 Aug;44(4):1229-35. Epub 2011 Jul 22.

6) Atalay, H., Solak, Y., Biyik, M., Biyik, Z., Yeksan, M., Uguz, F., et al. (2010). Sertraline treatment is associated with an improvement in depression and health-related quality of life in chronic peritoneal dialysis patients. *Int Urol Nephrol*, 42, 527-536

7) Balakrishnan, V.S., Guo, D., Rao, M., Jaber, B.L., Tighiouart, H., Freeman, R.L., et al. (2004). Cytokine gene polymorphisms in hemodialysis patients: association with comorbidity, functionality, and serum albumin. *Kidney Int*, 65, 1449-1460

8) Bellinghieri G, Santoro D, Mallamace A, Savica V, (2008): Sexual dysfunction in chronic renal failure. *J Nephrol* 21: s113– s117

9) Beusterien KM, Nissenson AR, Port FK, et al(1996): The effects of recombinant human erythropoietin on functional health and well- being in chronic dialysis patients. *J Am Soc Nephrol* 7:763–773.

10) Bleyer AJ, Hylander B, Sudo H, et al, (1999): An international study of patient compliance with hemodialysis. *JAMA* 281:1211–1213.

11) Blumenfield, M., Levy, N.B., Spinowitz, B., Charytan, C., Beasley, C.M., Jr., Dubey, A.K.,et al. (1997). Fluoxetine in depressed patients on dialysis. *Int J Psychiatry Med*, 27, 71-80

12) Bossola, M., Luciani, G. & Tazza, L. (2009). Fatigue and its correlates in chronic hemodialysis patients. *Blood Purif*, 28, 245-252

13) Bossola, M., Ciciarelli, C., Di Stasio, E., Conte, G.L., Vulpio, C., Luciani, G., et al. (2010). Correlates of symptoms of depression and anxiety in chronic hemodialysis patients. *Gen Hosp Psychiatry*, 32, 125-131

14) Brownbridge G, Fielding DM, (1994): Psychosocial adjustment and adherence to dialysis treatment regimes. *Pediatr Nephrol* 8:744–749

15) Chan, R., Brooks, R., Erlich, J., Chow, J. & Suranyi, M. (2009). The effects of kidney-disease related loss on long-term dialysis patients' depression and quality of life: positive affect as a mediator. *Clin J Am Soc Nephrol*, 4, 160-167

16) Chen CK, Tsai YC, Hsu HJ, Wu IW, Sun CY, et al (2010); Depression and suicide risk in hemodialysis patients with chronic renal failure. Psychosomatics. 2010 Nov-Dec;51(6):528-528.e526

17) Chiu K-L, Ryan CM, Shiota S, Ruttanaumpawan P,et al, ;(2006). Fluid shift by lower body positive pressure increases pharyngeal resistance in healthysubjects. *Am J Resp Crit Care Med*, Vol. 174, pp.1378–1383

18) Christensen.A.J, Charles W.Turner, James R. et al; Perceived Family Support as a Moderator Psychological Well-Being in End-Stage Renal Disease, Journal of Behavioral Medicine, Vol. 12, No. 3, 1989 page 249 - 265

19) Christensen, Alan J.; Wiebe, John S.; Smith, Timothy W et al(1994): Predictors of survival among hemodialysis patients: Effect of perceived family support;*Health Psychology*, Vol 13(6),521-525.

20) Christensen, A.J. & Ehlers, S.L. (2002). Psychological factors in end-stage renal disease: an emerging context for behavioral medicine research. *J Consult Clin Psychol*, 70, 712- 724.

21) Cohen,S,and Wills, T.A.; Stress, social support, and the buffering hypothesis. Psychol. Bull. (1985) 98(2): 310-357

22) Cohen, L.M., Dobscha, S.K., Hails, K.C., Pekow, P.S. & Chochinov, H.M. (2002). Depression and suicidal ideation in patients who discontinue the life-support treatment of dialysis. *Psychosom Med*, 64, 889-896

23) Cukor, D., Coplan, J., Brown, C., Friedman, S., Cromwell-Smith, A., Peterson, R.A., et al. (2007). Depression and anxiety in urban hemodialysis patients. *Clin J Am Soc Nephrol*, 2, 484-490

24) Cukor, D., Coplan, J., Brown, C., Friedman, S., Newville, H., Safier, M., et al. (2008a). Anxiety disorders in adults treated by hemodialysis: a single-center study. *Am J Kidney Dis*, 52, 128-136

25) Cukor, D., Coplan, J., Brown, C., Peterson, R.A. & Kimmel, P.L. (2008b). Course of depression and anxiety diagnosis in patients treated with hemodialysis: a 16-month follow-up. *Clin J Am Soc Nephrol*, 3, 1752-1758

26) Daneker, B., Kimmel, P.L., Ranich, T. & Peterson, R.A. (2001). Depression and marital dissatisfaction in patients with end-stage renal disease and in their spouses. *Am J Kidney Dis*, 38, 839-846

27) Drayer, R.A., Piraino, B., Reynolds, C.F., 3rd, Houck, P.R., Mazumdar, S., Bernardini, J., et al. (2006). Characteristics of depression in hemodialysis patients: symptoms, quality of life and mortality risk. *Gen Hosp Psychiatry*, 28, 306-312

28) Duarte, P.S., Miyazaki, M.C., Blay, S.L. & Sesso, R. (2009). Cognitive-behavioral group therapy is an effective treatment for major depression in hemodialysis patients. *Kidney Int*, 76, 414-421

29) Finkelstein F, Shirani S, Wuerth D, Finkelstein SH: Therapy insight: Sexual dysfunction in patients with chronic kidney disease. *Nat Clin Pract Nephrol*3: 200–207, 2007

30) Finkelstein FO, Finkelstein SH, Steele TE(1976):Assesssment ofmarital relationships of hemodialysis patients.*AmJMed Sci* 271:21–28.

31) Friend R, Singletary Y, Mendell NR, et al(1986): Group participation and survival among patients with end-stage renal disease. *Am J Public Health* 76:670–672.

32) Friend.R, Lena Hatchett, K.Wadhwa et al(, 1997),: Serum Albumin and Depression in End stage Renal disease. *Adv Perit Dial* 13:155–157.

33) Fryckstedt J, Hylander B et al(2008); Sexual function in patients with end-stage renal disease.; Scand *J Urol Nephrol*. ;42(5):466-71.

34) F..Moreno, J.M.Lopez Gomes, D.Sanz-Guajardo et al; Quality of life in dilaysis patients. A Spanish multicentre study: *Nephrology Dilaysis Transplantation*, volume 11, Issue supp2. page. 125 -129

35) Ginieri-Coccossis, M., Theofilou, P., Synodinou, C., Tomaras, et al; (2008). Quality of life, mental health and health beliefs in haemodialysis and peritoneal dialysis patients: investigating differences in early and later years of current treatment. *BMC Nephrol*, 9, 14

36) Hamdan H Al-Jahdali, ,Haithm A Khogeer, Waleed A Al-Qadhi,et al, (2010); Insomnia in chronic renal patients on dialysis in Saudi Arabia; *J Circadian Rhythms.* ; 8: 7.

37) Hedayati, S.S., Bosworth, H.B., Briley., et al. (2008). Death or hospitalization of patients on chronic hemodialysis is associated with a physician-based diagnosis of depression. *Kidney Int*, 74, 930-936

38) Hedayati, S.S. & Finkelstein, F.O. (2009). Epidemiology, diagnosis, and management of depression in patients with CKD. *Am J Kidney Dis*, 54, 741-752

39) Hener, Tamar; Matisyohu, Weisenberg; Har-Even, Dov et al (1996); Supportive versus cognitive–behavioral intervention programs in achieving adjustment to home peritoneal kidney dialysis. *Journal of Consulting and Clinical Psychology*, Vol 64(4), 731-741

40) House JS, Landis KR, Umberson D(1988); Social relationships and health: *Science*.; 241:540-5.

41) Hsu, H.J., Chen, C.K. & Wu, M.S. (2009). Lower prevalence of depression in hemodialysis patients who use polysulfone dialyzers. *Am J Nephrol*, 29, 592-597

42) Huang, T.L. & Lee, C.T. (2007). Low serum albumin and high ferritin levels in chronic hemodialysis patients with major depression. *Psychiatry Res*, 152, 277-280

43) Ibrahim, S. & El Salamony, O. (2008). Depression, quality of life and malnutritioninflammation scores in hemodialysis patients. *Am J Nephrol*, 28, 784-791

44) Iliescu EA, Coo H, McMurray MH, et al(2003); Quality of sleep and health-related quality of life in haemodialysis patients. *Nephrol Dial Transplant*: Jan;18(1):126-32.

45)IvanSeibel I Poli de Figueiredo CE, Telöken C, Moraes JF, (2002): Efficacy of oral sildenafil in hemodialysis patients with erectile dysfunction. J Am Soc Nephrol 13: 2770–2775

46) Jofre R, Lopez-Gomez JM, Moreno F, et al, (1998);. Changes in quality of life after renal transplantation. *Am J Kidney Dis* ;32:93-100.

47) Kalender, B., Ozdemir, A.C., Dervisoglu, E. & Ozdemir, O. (2007a). Quality of life in chronic kidney disease: effects of treatment modality, depression, malnutrition and inflammation. *Int J Clin Pract*, 61, 569-576

48) Kalender, B., Ozdemir, A.C., Yalug, I. & Dervisoglu, E. (2007b). Antidepressant treatment increases quality of life in patients with chronic renal failure. *Ren Fail*, 29, 817-822

49) Kalman TP, Wilson PG, Kalman CM et al; Psychiatric morbidity in long-term renal transplant recipients and patients undergoing hemodialysis. A comparative study. JAMA.1983 Jul 1;250(1):55-8.

50) Kao, T.W., Lai, M.S., Tsai, T.J., Jan, C.F., Chie, W.C. & Chen, W.Y. (2009). Economic, social, and psychological factors associated with health-related quality of life of chronic hemodialysis patients in northern Taiwan: a multicenter study. *Artif Organs*, 33, 61-68

51) Kaveh K, Kimmel PL(2001): Compliance in hemodialysis patients: Multidimensional measures in search of a gold standard. *Am J Kidney Dis* 36:244–266,

52) Keith Petrie; Psychological well-being and psychiatric disturbance in dialysis and renal transplant patients. British Journal of Medical Psychology. Volume 62, Issue 1, pages 91–96, March 1989

53) Keskin, G. & Engin, E. (2011). The evaluation of depression, suicidal ideation and coping strategies in haemodialysis patients with renal failure. *J Clin Nurs* (In press)

54) Kessler.R. C.,and McLeod.J.D.; Social support and mental health in community samples. Social Support and Health, Academic Press, New York, (1985). pp. 219-240

55) Kessler, R.C., Berglund, P., Demler, O., Jin, R., et al. (2003). The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA*, 289, 3095-3105

56) Kiecolt-Glaser JK, Newton T, Cacioppo JT, et al(1996): Marital conflict and endocrine function: Are men really more physiologically afffected than women?, *J Consult Clin Psychol* 64:324–332.

57) Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R(2002): Psychoneuroimmunology: psychological influences on immune function and health. *J Consult Clin Psychol* 70: 537–547.

58) Kimmel, P.L., Weihs, K. & Peterson, R.A. (1993). Survival in hemodialysis patients: the role of depression. *J Am Soc Nephrol*, 4, 12-27

59)Kimmel P, Peterson RA, Weihs KL, Immense SJ, etal , (1996):Psyc hologic functioning, quality of life, and behavioural compliance in patients beginning haemodialysis. *J Am Soc Nephrol* 7: 2152–2159.

60) Kimmel, P.L., Phillips, T.M., Simmens, S.J., Peterson, R.A., Weihs, K.L., Alleyne, S., et al. (1998). Immunologic function and survival in hemodialysis patients. *Kidney Int*, 54, 236-244

61) Kimmel PL, Peterson RA, Weihs KL, et al: Dyadic relationship conflict, gender and mortality in urban hemodialysis patients. *J Am Soc Nephrol* 11:1518–1525, 2000

62) Kimmel PL, Varela MP, Peterson RA, et al; Interdialytic weight gain and survival in hemodialysis patients: effects of duration of ESRD and diabetes mellitus. Kidney Int. 2000 Mar;57(3):1141-51

63) Kimmel, P.L. (2001). Psychosocial factors in dialysis patients. *Kidney Int*, 59, 1599-1613

64) Kimmel, P.L. & Peterson, R.A. (2005). Depression in end-stage renal disease patients treated with hemodialysis: tools, correlates, outcomes, and needs. *Semin Dial*, 18, 91-97

65) Kohli S, Aggarwal HK(2007). Psychological aspects of end-stage renal disease patients on maintenance hemodialysis. *Ind J Nephrol*. ;16:15–8
.

66) Koo, J.R., Yoon, J.W., Kim, S.G., Lee, Y.K., Oh, K.H., Kim, G.H., et al. (2003). Association of depression with malnutrition in chronic hemodialysis patients. *Am J Kidney Dis*, 41, 1037-1042

67) Kurella, M., Kimmel, P.L., Young, B.S. & Chertow, G.M. (2005). Suicide in the United States end-stage renal disease program. *J Am Soc Nephrol*, 16, 774-781

68) Kutner NG(2004): Quality of life and daily haemodialysis. *Sem Dial* 17: 92–98.

69) Loftis, J.M., Huckans, M. & Morasco, B.J. (2010). Neuroimmune mechanisms of cytokineinduced depression: current theories and novel treatment strategies. *Neurobiol Dis*, 37, 519-533

70) Martiny, C., De Oliveira, E.S.A.C., Neto, J.P. & Nardi, A.E. (2011). Factors associated with risk of suicide in patients with hemodialysis. *Compr Psychiatry*, 52, 465-468

71) Maruschka P Merkus, Jager KJ, Dekker FW, De Haan RJ et al(1999): Quality of life over time in dialysis: the Netherlands Cooperative Study on the Adequacy of Dialysis. NECOSAD Study Group. *Kidney Int* 56:720-728.

72) McClellan WM, Anson C, Birkeli K, et al (1991): Functional status and quality of life: Predictors of early mortality among patients entering treatment for end stage renal disease. *J Clin Epidemiol*, 44:83–89.

73) Merlino G,Piani A,Dolso P,Adorati M, et al(2006):Sleep disorders in patients with end stage renal disease undergoing dialysis therapy, *Nephrol dial transplant*,21(1):184-90.

74) Millman, R.P., Kimmel, P.L., Shore, E.T.,et al; . (1985). Sleep apnea in hemodialysis patients: the lack of testosterone effect on its pathogenesis. *Nephron*, Vol. 40, pp.407–410.

75) ML Patel, Rekha Sachan, Anil Nischal, et al(2012); Anxiety and Depression-A Suicidal Risk in Patients with Chronic Renal Failure on Maintenance Hemodialysis: *International Journal of Scientific and Research Publications*, Volume 2, Issue 3.

76) Montinaro, V., Iaffaldano, G.P., Granata, S., Porcelli, P., Todarello, O., Schena, F.P., et al. (2010). Emotional symptoms, quality of life and cytokine profile in hemodialysis patients. *Clin Nephrol*, 73, 36-43

77) Mucsi, I., Molnar, M.Z., Rethelyi, J., Vamos, E. et al; (2004). Sleep disorders and illness intrusiveness in patients on chronic dialysis. *Nephrol Dial Transplant*, Vol. 19, pp. 1815–1822.

78) Mucsi I ,Molnar MZ,Ambrus C,Szeifert et al(2005); M:Restless leg syndrome,insomnia and quality of life in patients on maintenance dialysis.*Nephrol Dial Transplant*,20(3):571-7

79) Murtagh FE, Addington-Hall J, Higginson IJ.(2007) The prevalence of symptoms in end-stage renal disease: a systematic review. *Adv Chronic Kidney Dis*.; 14:82-99.

80) Noshad, H., Sadreddini, S., Nezami, N., Salekzamani, Y. & Ardalan, M.R. (2009). Comparison of outcome and quality of life: haemodialysis versus peritoneal dialysis patients. Singapore Med J, 50, 185-192

81) Paulo R Santos*, José Roberto Frota Gomes Capote Júnior, Juliana U Cavalcanti , et al(2012); Quality of life among women with sexual dysfunction undergoing hemodialysis: a cross-sectional observational study Vieira Health and Quality of Life Outcomes , 10:103

82) Paparrigopoulos T, Theleritis C, Tzavara C,et al(2009); Sleep disturbance in haemodialysis patients is closely related to depression.;*General Hospital Psychiatry* , 31(2):175-177.

83) Peng YS, Chiang CK, Kao TW, Hung KY et al (2005) Sexual dysfunction in female haemodialysis patients: A multicenter study. *Kidney Int* 68: 760–765

84) Perneger TV, Whelton PK, Klag MJ(1995): Race and end-stage renal disease: Socioeconomic status and access to health care as mediating factors. *Arch Intern Med* 155:1201–1208.

85) Pertosa, G., Grandaliano, G., Gesualdo, L. & Schena, F.P. (2000). Clinical relevance of cytokine production in hemodialysis. *Kidney Int Suppl*, 76, S104-111

86) Port FK, Wolfe RA, Levin NW, et al, (1990): Income and survival in chronic dialysis patients. *ASAIO Trans* 36:M154–M157

87) Priscila Silveira Duarte, Maria Cristina Miyazaki, Sergio Luís Blay et al(2009) ; *Kidney International* 76, 414-421

88) Reiss D, Gonzalez S, Kramer N (, 1986): Family process, chronic illness and death: On the weakness of strong bonds. *Arch Gen Psychiatry* , 43:795–804.

89) Ricardo Sesso , Rodrigues-Neto JF, Ferraz MB(2003). Impact of socioeconomic status on the quality of life of ESRD patients. *Am J Kidney Dis*;41:186–95.

90) Riolo, S.A., Nguyen, T.A., Greden, J.F. & King, C.A. (2005). Prevalence of depression by race/ethnicity: findings from the National Health and Nutrition Examination Survey III. *Am J Public Health*, 95, 998-1000

91) R. Karaminia, S.A. Tavallaii, M. Lorgard- Desfuli – Nejad, et al; Anxiety and Depression: A Comparison Between Renal Transplant Recipients and Hemodialysis Patients, Transplantation Proceedings. Volume 39, Issue 4, May 2007, Pages 1082–1084

92) R.N.Mi Rye Suh, Jung HH, Kim SB, et al, (2002,): Effects of regular exercise on anxiety, depression, and quality of life in maintenance hemodialysis patients. *Renal Failure*,24(3):337-45.

93) Sabbatini M,Minale B,Crispo A,Pisani A, et al(2002); Insomnia in maintenance hemodialysis patients. *Nephrol dial transplant*, 17(5):852-6

94) Sagduyu A, Senturk VH, Sezer S, Emiroglu R, et al. (2006);. Psychiatric problems, life quality and compliance in patients treated with haemodialysis and renal transplantation. *Turk Psikiyatri Derg*.;17:22-31.

95) Samir S Patel, Shah VS, Peterson RA, Kimmel PL: Psychosocial variables, quality of life, and religious beliefs in ESRD patients treated with hemodialysis. *Am J Kidney Dis* 40: 1013–1022.

96) Sareen J, Cox BJ, Afifi TO, et al; Anxiety disorders and risk for suicidal ideation and suicide attempts: a population-based longitudinal study of adults. Arch Gen Psychiatry. 2005 Nov;62(11):1249-57.

97) Sensky T; Psychiatric morbidity in renal transplantation. Psychother Psychoso. 1989;52(1-3):41-6.

98) Shulman R, Price JDE, Spinelli J(1989): Biopsychosocial aspects of long-term survival on end-stage renal failure therapy. *PsycholMed* 19:945–954.

99) Son, Y.J., Choi, K.S., Park, Y.R., Bae, J.S. & Lee, J.B. (2009). Depression, symptoms and the quality of life in patients on hemodialysis for end-stage renal disease. *Am J Nephrol*, 29, 36-42

100) Sonikian, M., Metaxaki, P., Papavasileiou,et al. (2010). Effects of interleukin-6 on depression risk in dialysis patients. *Am J Nephrol*, 31, 303-308

101)Sousa AD. (2008) Psychiatric issues in renal failure and dialysis. *Ind J Nephrol*. ;18:47–50.

102) Soykan.A, Arapaslan.B, Kumbasar.H,; Suicidal behavior, satisfaction with life, and perceived social support in end-stage renal disease. Transplantation Proceedings. Volume 35, Issue 4, June 2003, Pages 1290–1291

103) Steidel JH, Finkelstein FO, Wexler JP, et al(1980): Medical condition, adherence to treatment regimens, and family functioning. *Arch Gen Psychiatry* 37:1025–1027.

104) Sugimoto.T, Nagake. Y, Sugimoto.S, et al (2002); Plasma Orexin concentrations in patients on hemodilaysis. *Nephron*; 90: 379.

105) Taskapan, H., Ates, F., Kaya, B., Emul, et al. (2005). Psychiatric disorders and large interdialytic weight gain in patients on chronic haemodialysis. *Nephrology* (Carlton), 10, 15-20

106) Tavallaii Abbas, S., Ebrahimnia, M., Shamspour, N. et al; (2009). Effect of depression on health care utilization in patients with end-stage renal disease treated with hemodialysis. *Eur J Intern Med*, 20, 411-414

107) Turner-Musa J, Leidner D, Simmens S, et al (999): Family structure and patient survival in an African-American end-stage renal disease population:Apreliminary investigation. *Soc Sci Med* 48:1333–1340.

108) Uchino BN, Caccioppo JT, Kiecolt-Glaser JK(1996): The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychol Bull* ,191:488–531

109) Yoshioka, M., Ishii ,T., & Fukunishi, I. (1993). Sleep disturbance of end-stage renal disease. Jpn *J Psychiatry Neurol*., Vol. 47, pp.847-851.

110) Young EW, Mauger EA, Jiang KH, et al(1994): Socioeconomic status and end-stage renal disease in the United States. *Kidney Int* 45:907– 911.

111) Yu-Sen Peng, Chih-Kang Chiang, Kung-Yu Hung, et al(2007); The association of higher depressive symptoms and sexual dysfunction in male haemodialysis patients; *Nephrol. Dial. Transplant*. 22 (3): 857-861.